

Letter to the Editor

A Suitable Model for Wound Healing: How Many Times Are We to Stumble Over the Same Block?

In a recent paper [1], once again fresh experimental wounds in murine skin were used to study the action of low-intensity (laser) light on the wound-healing process. And, as in many previous cases, irradiation of experimental wounds in rodent skin neither increased the wound closure nor affected the healing process by histological parameters. However, many publications over the decades have claimed that so-called laser biostimulation is a rather effective tool for healing human chronic wounds and ulcers not healed by traditional medical treatments. These reports have been criticized for the lack of double-blind studies, placebo groups, etc. I will not discuss whether it is ethical to use a placebo with people suffering (usually for a long time) with their illness or how one can gather a suitable number of similar wounds with similar etiology. The problem concerns appropriate modeling of these wounds and their healing. Indeed, double-blind experimental data must be collected and the mechanisms of underlying processes must be explained before further introduction of "laser biostimulation" into clinical practice.

Thus, there is a large gap between often-reported clinical cases of successful use of low-power lasers and LEDs in healing of human wounds (usually unique, e.g., Buerger's disease [2]), on the one hand, and the often-reported failure of well-planned double-blind experiments of healing fresh rodent skin wounds, on the other hand.

It seems clear that using fresh rodent wounds for modeling of human trophic ulcers is a dead end. A bit more promising seems to be using diabetic rodents [3,4] or pig skin [5], but these models are also far from optimal. What then? I do not know. Perhaps it would be wise to discuss this matter with wound-repair specialists (e.g., on pages of this journal or on the Internet) before continuing the endless game of "laser biostimulation is effective vs. it is not effective."

One conclusion reached from in vitro cellular experiments and the clinical "laser biostimulation" literature is that the cells in conditions of low oxygen concentration, acidic pH, or without necessary nutrients are much more sensitive (and susceptible) to irradiation than are those in optimal or near optimal conditions [6–8]. In case of fresh wounds, all stages of wound repair occur more or less at their natural rate; thus, no substantial acceleration due to the irradiation can be expected for biological reasons. Can this knowledge help to create an appropriate and suitable animal model?

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